NEWSLINE

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Year of Physics festivities begin

This year marks the 100th anniversary of a defining point in the history of science. In a single year — 1905 — Albert Einstein wrote three groundbreaking scientific papers that altered the world's concepts of matter, energy, space and time. (See sidebar.) This included publication of his famous formula, $E = mc^2$. In that "miraculous year," as it's been called, Einstein paved the way for all of modern-day physics.

In celebration of this milestone, the International Union of Pure and Applied Physics and the United Nations Educational, Scientific and Cultural Organization have declared 2005 the World Year of Physics.

The Laboratory is marking the occasion with a number of events for both employees and the public. In May, there will be a week of activities, ranging from a panel discussion on the future of physics to stage presentations on the life of Marie Curie. Also that week, the Lab will host community leaders to learn more about the Lab and why it is a premier physics research facility and a world leader in science and technology. A number of other events and projects are scheduled or in development. (See accompanying listing of events.)

From its inception in 1952, Lawrence Livermore National Laboratory has applied the modern-day physics that flowed from Albert Einstein's "miraculous year" to current world challenges. The Laboratory's first mission was to apply nuclear fission and fusion — processes based on Einstein's famous formula $E = mc^2$ — to further nuclear weapons science and technology.

As we celebrate the World Year of Physics 2005, the Laboratory recognizes and pays tribute to Einstein's remarkable scientific achievements in the realm of physics, and their impact on research activities at Lawrence Livermore National Laboratory and on all of modern-day physics.

More World Year of Physics – see page 5

Physicist George Chapline challenges accepted view of relativity's black holes

By Anne M. Stark
NEWSLINE STAFF WRITER

In the 1979 movie "The Black Hole," the crew of the Palamino spaceship passes through a black hole and enters a world of confusion where space and time are warped.

But in reality, if the crew approached the surface of a compact object, which general relativity would identify as a black hole, they would all disintegrate, according to N Division physicist George Chapline.

Chapline says that ordinary matter would break apart because the protons and neutrons in the matter would disintegrate. Further, Chapline says black holes do not really exist. Instead, he proposes that the mass of compact astrophysical objects consists of the same dark energy that makes up 60 percent of the mass of the universe.

According to Albert Einstein's theory of general relativity, a black hole results from the death of a massive star and its eventual collapse under its own gravity to a single point. According to general relativity, space and time switch places inside an event horizon. However, quantum mechanics dictates that space and time continue to

See **BLACK HOLES,** *page 8*

Review of the 300 series structure now complete and ready for comment

A review of the 300 series classification and pay structure was recently completed as part of the Laboratory's Integrated Performance and Pay Program (IPPP).

The study was undertaken to assess whether this structure is competitive with the market, is meeting the needs of the Laboratory and reflects best practices. The project team, consisting of representatives from directorates who utilize 300 series employees, found the 300 series needs little change to meet all three objectives.

After reviewing salary survey data, the review team found that the salary structure consisting of four pay grades is appropriately aligned with the market. The team also concluded that the Laboratory's 300 series job classifications are properly placed in their current pay grades.

To simplify and clarify the 300 series classification structure, the project team has made the following recommendations:

• Merge Computer Programming and

See **300 SERIES,** *page 8*

First delivery of IBM 'Purple' completed

Delivery to the Laboratory of the Advanced Simulation and Computing program's "Purple" supercomputing system began last week.

The 16+ TeraFLOP/s phase one delivery of the 100 teraFLOP (trillion floating operations per second) IBM machine is being installed in the Terascale Simulation Facility's (TSF) second computer room. "We're making rapid progress with the installation of the first cluster," said Pam Hamilton, Purple Integration Project leader.

JACQUELINE MCBRIDE/NEWSLINE

From left: Pam Hamilton and Kim Cupps of LLNL consult with Nick Primiano of IBM during installation of ASC's Purple supercomputer.

Purple is a huge machine based on symmetric shared-memory multiprocessors (SMP) containing more than 12,000 next-generation IBM Power5 microprocessors.

See **PURPLE,** *page 8*

Town meetings scheduled — Page 3

Plasma physics award for NIF's Glenzer — Page 7

Composing a secure password — Page 7

LAB COMMUNITY NEWS

Weekly Calendar

Technical Meeting Calendar, page 4

Wednesday 4

The LLNL Amigos Unidos Hispanic Networking Group will hold its annual celebration of **Cinco de Mayo** today at 11:30 a.m. to 1 p.m. at the picnic area near the former pool area. Come and enjoy the cultural festivities including delicious food plates, carnivals, chile Colorado, tamales and plenty of Latin music and dancing. The event is co-sponsored by Computation, Engineering and the LLNL Worklife Center.

Tamale and food sales are used to fund scholarships for local high school students. The pre-ordered tamales will be distributed at the event. The last day to pre-order tamales is Friday, April 29. You can order tamales by contacting one of the following Amigos:

Jessica Noriega, 2-9530,
Trailer 1826, room 100
Michael T. Martin, 3-6580,
Bldg. 411, room 1511A
Irene Ortega, 2-6350,
Bldg. 453, room 2146
Marian Barraza, 3-7063,
Bldg. 671, room 1322
Yahel De La Cruz, 4-3507,
Bldg. 314, room 2202
David Castro, 3-7556,
Trailer 5477, room 1037
Mary Judkins, 4-4639,
Bldg. 332, room 1221
Marta Holm, 2-8870.
Bldg. 131, room 1612

Thursday 5

Come join in the celebration of the 54th Presidential **National Day of Prayer** at noon today in the Bldg.155 auditorium (north side, first floor). The theme for this year's program is "God Shed His Grace on Thee." Please note that Bldg. 155 is a new location from last year. No food is allowed in the auditorium. For further information, contact Kelley Ellis at 4-3954.

Up & Coming

The **American Cancer Society** is having its annual fund-raising activity. This year local Manteca residents will be working together in the Society's "Relay for Life" where everyone can participate in the fight against cancer. Teams of people will camp out at the East Union High School May 14–15 and take turns walking or running around the track for 24 hours, symbolizing that cancer never sleeps. Help fight this horrible disease that has taken many people. If you have questions, contact team captain Kassandra Bosch at (707) 592-0658. Donations for the event or for the burning of a Luminaria (in memory of someone lost to cancer, still fighting cancer or in recognition of someone who has beaten this disease) can be sent to Walter Unites at L-286. Checks should be made payable to the American Cancer Society.

Made in the shade

JACQUELINE MCBRIDE/NEWSLINE

The Laboratory's Food Services recently installed umbrellas on the terrace of the Central Cafe, providing shade for noontime diners.

IN MEMORIAM

Daniel J. "Bud" O'Neil

Daniel J. "Bud" O'Neil died at home on April 23. He was 73. O'Neil was born June 8, 1931, and spent many hours with his maternal grandparents, Frank and Agnes McCormick, on their local ranches.

He graduated from St. Michael's Catholic School and Livermore High School.

After serving in the Marines, he worked for Lone Star Ind. in Pleasanton for many years. He retired from the Lab at the age of 62, devoting the next 11 years to caring for his grandson, Justin.

O'Neil was preceded in death by his parents, his sister, Frances Ferrario, and uncles, Jack and Nevin McCormick. He is survived by his wife of 42 years, Mary Jane Rooney O'Neil; daughters, Tammy Kent and husband, Don, of Millbrae, and April Herron and husband, Johnny of Nevada; and several grandsons and nephews.

Kurt Evan Bauman

Kurt Evan Bauman died April 16 in San Ramon in an automobile accident. He was 35. Bauman graduated from Granada High School. He worked at the Lab for eight years in the library before working for Advance Business Equipment and Technology for the last nine years.

Bauman loved computer games, cats and bowling. He was an avid reader. He is survived by his parents Jim and Ruth Bauman of Livermore; an aunt and uncle, Miriam and Harry Baker; and 24 first cousins.

Services were held. Memorial gifts are suggested to a charity of choice.

Newsline

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News of note

Lockout and Tagout Program ensures work safety

By Dale Sprouse
TID

The Hazards Control Department reminds supervisors that they must conduct annual personnel inspections to ensure that employees classified as "LOTO-authorized workers" are adhering to requirements of the Laboratory's LOTO program.

LOTO is shorthand for the Lab's Lockout and Tagout (LOTO) Program, designed to protect employees who repair and maintain equipment from unintended releases of hazardous energy.

"LOTO applies to anyone working with hazardous energy, from Plant Engineering people who do maintenance all the time to scientists and engineers who occasionally tweak their experimental equipment," says Keith Gershon, the Laboratory's electrical safety subject matter expert, and an ES&H Team deputy team leader.

LOTO specifies a series of procedures that must be followed for deenergizing and securing equipment that could potentially release hazardous energy before maintenance or repair work can begin. The procedures are detailed in Document 12.6 (LLNL Lockout and Tagout Program) of the ES&H Manual.

"Most people think of lockout/tagout as an electrical precaution, but it is more than that," said Dan Benjamin, supervisor of Hazard Control's Occupational Safety Section. "Electricity is one of the hazards we are concerned about. But LOTO is concerned with mechanical, chemical, and thermal energy, radiation, pneumatic pressure—any kind of energy source."

Still, Benjamin says, electricity is a safety focal point these days for the Department of Energy, which has initiated a complex-wide campaign to improve electrical safety performance. "We are doing our part here to get the word out about electrical safety and safety in general," he said.

Benjamin and Gershon say the LOTO Program is a perfect fit for the culture of "personal safety" that the Laboratory is encouraging. LOTO procedures are designed to give safety control to the individual performing the maintenance or repair work.

The heart of the LOTO Program is a distinctive LOTO lock, which a worker affixes to the deenergized system before repair or maintenance can begin. There is only one key to the lock and the person performing the work is the one who engages the lock and keeps the key. If two, three or more persons are performing work, each must affix his or her lock and an associated LOTO tag. Workers are not permitted to give their key to someone else.

"The lock is a method of communication," says Gershon. "It says: 'I am working on the line, my life is on the line downstream.' With the key in your possession, you have ultimate protection and assurance that the equipment will not be turned back on while you are working."

In performing the annual LOTO inspection of "LOTO-authorized workers," supervisors or their designees must observe the worker's use of LOTO procedures using a LOTO Inspection Checklist available in ES&H Manual Document 12.6 (LLNL Lockout and Tagout Program). The checklist requires that the supervisor assess whether:

- The worker has received appropriate training
- There is an adequate number of LOTO locks and tags
- Energy-isolating devices are lockable and properly labeled
- The employee is able to demonstrate knowledge of LOTO procedures and as part of those procedures verifies that the energy source has been deenergized before starting work.

"Verification is a key element of LOTO," said Gershon. "We don't want someone to throw a switch, put on a lock and assume the system has been deenergized. A worker must challenge the system and certify that the energy isolation device being used is effectively controlling that energy.

"In fact, we require that a positive verification be made that the energy has been disconnected before work starts," Gershon continued. "You can do that verification in a number of ways. If you were an electrician, you would use a voltage tester to test the wire. If you were locking out a crane, you would go to the crane and push the start button to see if it moves."

Quoting from the section of the ES&H Manual that details the LOTO Program, Gershon said: "Many of the worst industrial accidents are caused by an accidental release of energy. Energy sources that are not neutralized and locked out have the potential to cause severe injury, disfigurement, or death from electric shock, contact with rotating machinery, burns, or other causes."

Supervisors with questions about the annual LOTO inspection requirement are encouraged to review Document 12.6 in the ES&H Manual, contact a member of their directorate's ES&H Team, or call or email Benjamin (3-1339 or benjamin2@llnl.gov).

Health Services revises process for self-pay Laboratory tests

Health Services Department (HSD) provides self-pay lab tests as a convenience for LLNL employees. Self-pay laboratory orders are tests not ordered by an HSD clinician and include tests ordered by a private physician (PMD), cholesterol (lipid) tests, and prostate specific antigen (PSA).

The Health Services process for employee payment of self-pay laboratory orders has recently been revised. Payment must be made to the receptionist (or Site 300 nurse) in advance of the blood draw, by either cash or personal check only. If payment cannot be made at the time of the blood draw, the blood sample will not be processed until Health Services has received payment. If payment is not made within three calendar days of the blood draw, the tests will not be done.

To access this service, note the following:

• For PMD lab tests, employees are responsible for obtaining the written orders from their doctors and bringing them to HSD when they expect to have their blood drawn.

• Employees are responsible for paying the costs of the test(s) to Health Services; these are pass-through costs (i.e., the costs that the Health Services vendor charges LLNL for its tests).

• Actual cost(s) may vary and should be verified at the time of the visit to Health Services.

• Health Services does not provide direct billing to health insurance companies.

• It is employees' responsibility to deliver the results to their physicians.

If you have any questions about this service, please call Health Services at 2-7459.

Livermore police enforcing traffic rules at Westgate entrance; Employees urged to exercise patience and use alternate access

"Don't block that box" warnings are posted at some congested intersections in major cities around the nation. Now Livermore is sharing this metropolitan concern at the Laboratory's Westgate entrance.

The temporary closure of Greenville Road has increased morning commute traffic on Vasco Road at Westgate Drive. The City of Livermore has focused special traffic enforcement at that intersection during morning hours, using one or two motorcycle officers to cite drivers for violations.

The major infraction is getting stuck in the middle of the intersection when the light changes from green to red. Vehicle Code Section 22526 prohibits a driver from entering an intersection on a green light unless there is sufficient space for the driver's vehicle on the other side of the intersection.

Safeguards and Security Organization Director Dave Leary says, "We shouldn't attempt to get through a traffic light on 'our cycle,' regardless of the traffic conditions in front of us. The Vehicle Code and sound traffic-safety practices require us to wait until there's room on the other side. We must be more patient."

Drivers who get caught blocking the box may have to pay the price: A traffic citation. A far better solution is to avoid the morning Westgate crunch by taking Patterson Pass to Greenville Road, and enter through the less crowded East Gate.

Westgate Drive traffic circle will close the weekend of May 7

The Westgate Drive traffic circle will be closed to through traffic on Friday evening at 6 p.m. May 6, due to construction. The Traffic Circle will reopen with restrictions on Monday morning at 6 a.m. May 9. Tentatively, the traffic circle will fully open with no restrictions on May 18.

The construction will affect pedestrian and vehicle traffic. Detour signs and assistance will be available to direct traffic around the closed area.

Take special care to drive safely while construction is in progress. Observe all traffic warning signs, barricade lines and the posted speed limit.

If you have questions about the project and roadway conditions please call the Plant Engineering Construction Manager, Steven Shih, at 3-9308 or Inspector Al Alvarado at 3-4068 or 525-4290.

News you can use

Employees invited to Aurora town hall meetings

Aurora Strategic Planning Teams will host a series of town hall/brown bag lunch meetings in May and early June to share ideas and gather input from employees.

The Aurora project is designed to develop strategic initiatives that will effectively position the Laboratory for its new 2025 vision: a multidisciplinary science and technology laboratory dedicated to national security in the global context. The project was named after Aurora, the Roman goddess of the dawn.

The Aurora project has been divided into five strategic planning areas: Missions and Sponsors; Science and Technology; Operations and Infrastructure; Workforce and Work Environment, and Partnerships and Relationships. Approximately 100 employees from across the Laboratory are serving as team members.

"The purpose of the town hall meetings is to generate a broad range of ideas for the strategic initiatives," said Cherry Murray, deputy director for science and technology. "While we have some starting points, we are looking for creative, out-of-the-box ideas from everyone. I truly hope that all employees will come to the meetings and help us shape the future of the Lab."

In addition to the town hall meetings, employees may submit ideas to the teams or associate directors via the MyLLNL portal. All ideas will be considered.

The meetings set up to date will be:

May 12 — Workforce and Work Environment, Bldg. 123 auditorium

May 16 — Partnerships and Relationships, Bldg. 123 auditorium

May 26 — Science and Technology, Bldg. 155 auditorium.

All meetings will be from 11:30 a.m. to 1 p.m.

Technical Meeting Calendar

Friday 29

INSTITUTE FOR GEOPHYSICS & PLANENTARY PHYSICS
"The Impact of Massive Stars on the Evolution of Star Forming Galaxies," by Eric Wilcots, University of Wisconsin-Madison. Noon, Bldg. 319, room 205. Property protection area. Foreign national temporary building access procedures apply. Contact: Wil van Breugel, 2-7195, or Lisa Lopez, 3-0250.

CENTER FOR APPLIED SCIENTIFIC COMPUTING (CASC)/INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH (ISCR)
"Visualization of Complex Heap-Based Data Structures," by Andreas Saebjornsen, University of Oslo, Norway 10 a.m., Bldg. 451, room 1025 (White Room). For more information, go to http://www.llnl.gov/casc/calendar.shtml. Property protection area. Foreign national temporary building access procedures apply. Contact: Dan Quinlan (CASC), 3-2668, or Erica Dannenberg, 3-2167.

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Monday 2

CENTER FOR APPLIED SCIENTIFIC COMPUTING (CASC)/INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH (ISCR)
"Multiphysics Couplings of Subsurface and Surface Flows," by Ivan Yotov, University of Pittsburgh. 10 a.m., Bldg. 451, room 1025, White Room. For more information, go tohttp://www.llnl.gov/casc/calendar.shtml. Property protection area. Foreign national temporary building access procedures apply. Contact: Carol Woodward (CASC) 4-6013, or Erica Dannenberg, 3-2167.

Tuesday 3

CHEMICAL BIOLOGY AND NUCLEAR SCIENCE DIRECTORATE/BIOSECURITY & NANOSCIENCES LABORATORY
Post-doctoral applicant seminar. "Theory, Design and Demonstration of Electroosmotic Pump Technologies," by Shuhuai Yao, Stanford University. 1 p.m., Bldg. 154, room 1013. Foreign nationals may attend if approved plan is on file which includes Bldg. 154. Contacts: Kathy Ricard, 3-8024, or Chris Orme, 3-9509.

PHYSICS & ADVANCED TECHNOLOGIES DIRECTORATE
"Weighing the Photon," by Dimtri D. Ryutov, Fusion Energy. 2 p.m., Bldg. 2128, room 1000. Common use facility. Foreign nationals may attend. Contact: Alan J. Wootton, 2-6533.

Wednesday 4

NIF SCIENCE AND TECHNOLOGY SEMINAR SERIES
"Advanced Radiographic Capability on NIF: Development and Applications of the Next Generation Petawatt Technology," by Chris Barty, 11 a.m., Bldg. 482 auditorium, room 1103. Property protection area. Foreign national temporary building access procedures apply. Contact: Leticia Molina, 2-7715.

PHYSICS AND ADVANCED TECHNOLOGIES/N DIVISION
"Update on Detection of Well-Shielded Special Nuclear Material in Cargo Containers," by Dennis Slaughter. 1:30 p.m., Bldg. 211, room 227. Property protection area. Foreign national temporary building access procedures apply. Contact: Dennis Slaughter, 2-6425, or Pat Smith, 2-8210.

ENGINEERING LECTURE SERIES
"Linear Source in a Circular Tunnel," by Donald Dudley, University of Arizona. 2 p.m., Bldg.155, auditorium. Contact: Ann Tyler, 2-4380.

Thursday 5

CENTER FOR APPLIED SCIENTIFIC COMPUTING (CASC)/INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH (ISCR)
"Keeping the Columbia Flowing: Managing the Data from an Environmental Observation and Forecasting System," by David Maier, Portland State University. 10 a.m., Bldg. 451, room 1025, White Room. For additional information, go to http://www.llnl.gov/casc/calendar.shtml. Property protection area. Foreign national temporary building access procedures apply. Contact: Karen Karavanic (CASC/ISCR), 3-4480, or Erica Dannenberg, 3-2167.

Friday 6

INSTITUTE FOR GEOPHYSICS AND PLANETARY PHYSICS
"Nearby Galaxies as Revealed by the Spitzer Space Telescope," by Robert Kennicutt, Steward Observatory, University of Arizona. Noon, Bldg. 319, room 205. Property protection area. Foreign national temporary building access procedures apply. Contact: Wil van Breugel, 2-7195, or Lisa A. Lopez, 3-0250.

Monday 9

CENTER FOR APPLIED SCIENTIFIC COMPUTING (CASC)/INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH (ISCR)
"High-Performance, Power-Aware Distributed Computing," by Kirk W. Cameron, University of South Carolina, 10 a.m., Bldg. 451, room 1025, White Room. Property protection area. Foreign national temporary building access procedures apply. Contact: Karen Karavanic (CASC/ISCR), 3-4480, or Erica Dannenberg, 3-2167.

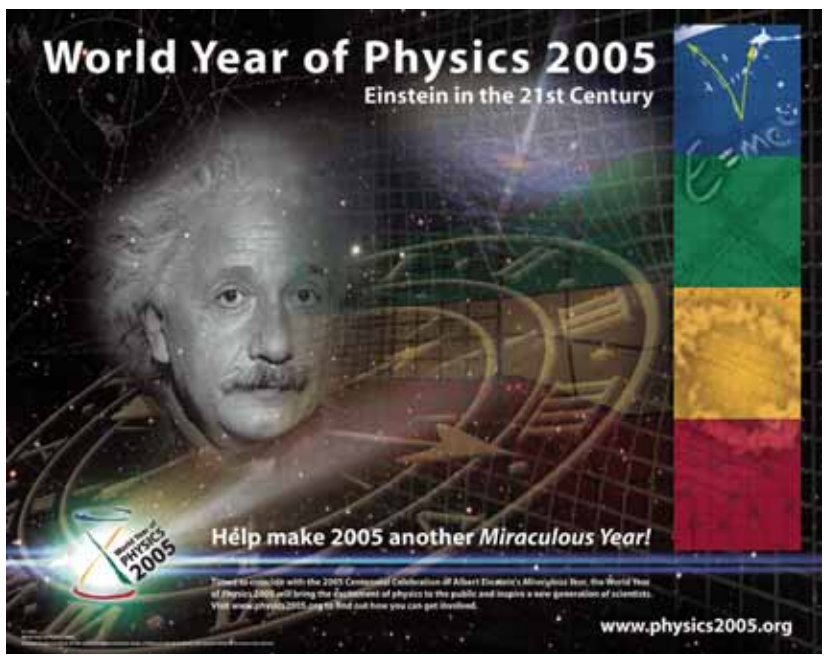
PHYSICS & ADVANCED TECHNOLOGIES DIRECTORATE-WIDE SEMINAR
"Probing Hydrogen Bonding in Water and Ice Using X-rays," by Anders Nilsson, Stanford Synchrotron Radiation Laboratory-Stanford University and Fysikum, Stockholm University, Sweden. 10 a.m., Bldg. 2128, room 1000. Common use facility. Foreign nationals may attend. Contact: Giulia Galli, 3-4223, and Alan Wootton, 2-6533.

The deadline for the next Technical Meeting Calendar is noon, Wednesday.

Bruce Tarter to lead Future of Physics discussion

The last century was a momentous period for physics, begun with Albert Einstein's miraculous year in 1905. His thought experiments, as he called his work, touched off an accelerated understanding of the physical world. In the next quarter century, the horizons of our understanding promise to extend to the far reaches of our imaginations.

To be able to peer across those horizons and see what's coming would be an enticing prospect. Fortunately, next month Lab employees will be able to get just such a peek into the future from a group of physics oracles. As part of Physics Week at the Lab, a panel of eminent Lab researchers will gather to speculate on the Future of Physics. Employees are invited to attend this unusual event at the Bldg. 123 auditorium on May 26 from 11:30 to 1 p.m.



The Future of Physics panel will be led by former Lab Director Bruce Tarter. Panelists will include former Lab Director John Nuckolls, Deputy Director for Science and Technology Cherry Murray, Biosciences Associate Director Elbert Branscomb, Karl van Bibber, chief scientist in the Physics and Advanced Technologies Directorate, and Leslie Rosenberg, a physicist in the Physics and Advanced Technologies Directorate.

The panelists will let their imaginations roam free. However, each will address a specific field of physics. Nuckolls will focus on fusion, Murray will speak on condensed matter, Branscomb will share his thoughts on biophysics, van Bibber will talk about high energy physics and big accelerators, and Rosenberg will reflect on dark matter and dark energy.

The panelists are people working at the frontiers of physics — visionary people, said Tarter. And they're exciting speakers.

The topics slated to be covered are some of the most important and stimulating in physics today, Tarter said, and all are active fields of research at LLNL.

Controlled fusion is one of the holy grails of physics, and Nuckolls has been thinking and leading our work for many decades.

Condensed matter is about the physics that describes the stuff of ordinary life and is central to the advances in areas such as nanotechnology

Biophysics is all about us. What will we be in 25 years? Can we understand life at a deeper and more predictive level and use physics to help in our quest?

High energy physics is ultimate physics. Its about the heart of matter. In the next 25 years, someone will build the next big accelerator to probe deeper into that heart, but can any one country do that? Who will build it? Where will it be built?

When we talk about dark matter and dark energy were talking about what the universe is made of. In 25 years, we may have some answers.

Tarter encourages all interested employees to come and learn about the future and to speculate along with the panelists.

The discussion will be at a *Discover* magazine level, so that any reasonably technically literate person will come away enlightened and, hopefully, inspired.

Laboratory offers full menu of events to mark Year of Physics

Livermore-Pleasanton Student Contests

• Poster Contest for 4th & 5th graders on "physics in everyday life." Winners will receive $50 cash prize. Entries due by May 8. Winner will be announced May 23.

• Egg-Drop Contest for middle school students to be held May 16 at 3:30 p.m. in the Discovery Center parking lot. Winning team will receive $100 cash prize.

• Physics Poetry Contest for high school students. Entries due by May 6. Winning poet will receive $100 cash prize. Winner will be announced May 23.

For more information on the contests go to http://www.llnl.gov/pao/WYOP/index.html

Physics Day at Six Flags Marine World in Vallejo — May 6

• The LLNL Fun With Science show will perform and the Laboratory will staff an information booth.

Discovery Center "World Year of Physics 2005" Exhibit - Opening mid-May

• A LLNL Discovery Center exhibit devoted to the Year of Physics, covering Albert Einstein's "miraculous year," "What is Physics?" and an overview of physics at LLNL. Interactive displays on loan from the San Francisco Exploratorium also will be on hand through July.

Physics Week

Monday, May 23

• LLNL Science Day

Talks and a poster expo by Lab researchers and invited guests linking today's research to Einstein's theories, published 1905, that changed the course of science. Presentations will be in the Bldg. 123 auditorium from 8 a.m. to 5 p.m. The poster expo will be in the West Cafeteria parking area from 8 a.m. to 5 p.m., with exhibitors present from 11:45 a.m. to 2 p.m. For more information, go to http://ScienceDay.llnl.gov

• "Manya - A Living History of Marie Curie"

One-woman stage performance by Susan Marie Frontczak. For local high school students. Livermore High School auditorium, 10 a.m.

• "Manya - A Living History of Marie Curie"

One-woman stage performance by Susan Marie Frontczak. Free to the general public. Livermore High School auditorium, 7-9 p.m.

Tuesday, May 24

• Community Leader Day

Invited guests from the community will learn about the Laboratory and the World Year of Physics from LLNL senior managers. (Morning)

• "Manya - A Living History of Marie Curie"

One-woman stage performance by Susan Marie Frontczak. For all Laboratory employees. Bldg. 123 auditorium, 2-3 p.m. (Performance will be simulcast on Laboratory TV). For more information, go to http://www.llnl.gov/pao/WYOP/index.html

Wednesday, May 25

• **"Future of Physics" panel**

Moderated by Bruce Tarter, a panel of distinguished LLNL researchers will speculate on the future of physics. Bldg. 123 auditorium, 11:30 a.m.-1 p.m. (See sidebar)

Thursday, May 26

• Director's Distinguished Lecturer Series speaker C.W. Francis Everitt of Stanford University has tentatively been scheduled to speak.

• LLNL's Simon Labov to speak to the Livermore Chamber of Commerce on the history of physics and physics research at LLNL.

Livermore Rodeo Parade - June 11

• The LLNL "Cool Scientists Drill Team" will perform in the annual parade, accompanied by Laboratory senior managers escorting the team along the parade route.

Got Science? Discover Science Saturday

Got Science? Discover Science Saturday - June 25, 10 a.m. to 2 p.m. in the Public Affairs Office courtyard and parking areas.

A Saturday science open house for the public, with science demonstrations, interactive displays and contests for kids.

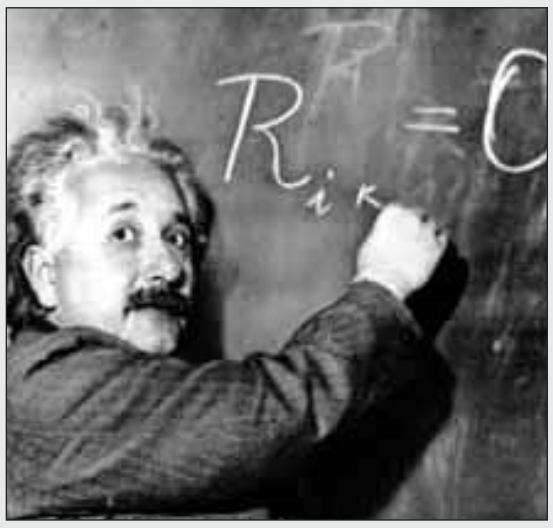
Science in the Movies - August 9, two shows in the Tri-Valley, times and locations (to be announced)

Movie special effects coordinator Steve Wolf brings to town his science show for kids, designed to teach basic physical science concepts using his experience as a movie stunt coordinator.

UC Physics Day for Students - September, date and time (to be announced)

High school physics students will be invited to LLNL to hear from Lab researchers and University of California faculty about physics study and research. UC admissions staff will also be on hand to discuss UC enrollment.

Einstein's 'Miraculous Year'



The three major papers Albert Einstein presented in his "miraculous year" of 1905 foretold the past century's explosion in our understanding of the laws that govern the universe on scales from sub-atomic to intergalactic. In one year, Einstein set the stage for condensed-matter physics, quantum theory and cosmology.

In his paper on "Brownian motion," Einstein laid out clear evidence that all matter — solid, liquid or gas — is made up of atoms that are in constant motion and that become hotter the faster they move.

Einstein's paper on the quantum nature of light explained how light is made up of separate packets of energy, or "quanta" (now called photons), rather than continuous waves.

Finally, in his well-known paper introducing the theory of relativity, Einstein showed that the measured rate of time and the length and mass of an object depend upon speed relative to the observer. Only the speed of light is constant.

In a supplement to the third paper, Einstein also demonstrated that mass and energy are equal in the famous formula E = mc2. Put simply, this formula says that matter can be transformed into energy and energy can be transformed into matter.

Classified ads

See complete classified ad listings at https://www-ais.llnl.gov/newsline/ads/

Automobiles

1991 - TOYOTA CAMRY - Rare 5 spd, V6. AC, Cruise, power windows, locks, moon roof. New tires and brakes (4K mi) Good condition. $3200 925-443-6014

1998 - Honda Accord EX Coupe,V6,AT,AC,drk green ext,beige leather int,sunroof,CD,fully loaded.Good condition, $8,000 OBO. 209-834-0798

2003 - Ford Focus ZX3, 5-Pass. Hatchback, Auto, Tilt, Cruise, Air, PS, PB, Fog lights, CD/MP3, Sunroof, Warranty, 15K Miles, Perfect Cond., $9,750 obo, 925-443-3970

2001 - Pontiac Grand Am GT Coupe. Excel Cond! Leather, All Power, Loaded, Sun Roof, 74k. Very Sporty! $9000 obo 209-825-7810

1988 - Ford Escort-Turbo, 2 doors, 5 speed, new distributor cap and wires. Runs good. $1,300 or B/O. 209-862-1567

1993 - Volvo 940 4 door, ABS, leather, sunroof, all amenities, mint condition, reliable, safe, $3799 925-449-3170

1999 - Ford Explorer 4D XLT 4WD, excellent condition, white, V6 4.0 liter, approximately 120,000 miles, loaded with extras...asking $8,500. 925-784-3825

2000 - Ford Mustang GT, Red Exterior, Black leather interior, air-con, deluxe sound system, cd/cassette, 40k miles, great condition. $9995 925-292-8810

2003 - Nissan 350Z, 9000 miles, Silver, 3.5L V6, m/t 6 speed, Bra, Cold-air intake, Stillen Speed Grill, Loaded, Excellent Condition, $24,000. 209-832-7262

1999 - Hyundai Accent, 35-40 mpg, 5spd, 4cyl, 2dr, am/fm cass, cold a/c, runs great, new front brakes, 105k miles, $1,950 209-575-3819

1995 - Dodge RamVanV8,118K,customized blue interior,excel conditn, elec bed,TV/VCR ceiling strip lites. priced to sell $7,400.OBO. 925-513-0160

2000 - Honda Civic EX, good condition. Great gas mileage, a perfect commuter car. 107,000 miles, new tires, timing belt changed at 90k. $7,000. 925-672-2354

Automobile Accessories

4-MXV Michelin tires, 225/60/R16 installed to 2001 Mercedes Benz S430 alloy wheels. Used less than 1000 miles. Asking for $400 for all or make offer. 925-426-0648

Bed Liner, Dodge Full Size 2002-2005 short bed. 6 months old, great condition. $50. OBO 925-443-4844

Bicycles

Please return womens bike borrowed ~ 2 weeks ago: black, 3-speed hub, from green area at bldg. 111 gate north of bldg. 123. Thanks. 510-548-0704

2001 Quintana Roo kilo, 57cm like new with spinergy rev X wheels, ultegra, fsa, crank, Worth over $2500 will sell for $1200 209-551-5514

Boats

35HP electric start outboard Evinrude. Includes key/switch, gas can and cables for speed, fwd/rvrs and steering. 925-766-8233 Make Offer. 925-516-2570

2004 Reinell 191BR. 19ft Yellow/White open bow w/ matching bimini top. Only out 4 times last year. Great family/fishing/sporting. Always garaged. 209-356-1747

Electronic Equipment

New palmsize hi-res videocamera/digital camera/MP3 player. Record DVD quality video on SD memorycard. Playback on TV/computer, sacrifice for $289 415-543-3643

Palm Tungsten T3 w/ software for Mac/PC, Hotsync/Charging cradle, 64MB expansion card, hard case, original cover, aftermarket AC Adaptor. $200 firm. 925-381-2034

Giveaway

Waterbed, waveless mattress, raised platform, headboard with mirror/shelves. 209-895-7050

Two >20 year old helium-neon alignment lasers with power supplies, one 120VAC, one 12VDC. Operating condition unknown. 925-455-5575

Old metal 6 gallon wet-dry Shop-Vac with wand, dolly, filter and instructions. Needs new motor. 925-449-6911

Household

Wooden estate pieces with intricate Chinese carvings. Cocktail bar, four drawer chest, camphor-lined blanket chest, two four-paneled screens. 209-814-8887

White metal sofabed frame. You add the futon. Make reasonable offer. 925-516-2570

Pine bunk bed set, stacked, w/desk, storage and extra dresser, $500. 925-947-1120

Moving Sale: Steam Cleaner New=$100. Hope chest=$50. Day bed w/new mattress=$50. Color Printer/Scanner/Copier Lexmark new=$50. Airwalker=$40. 209-814-5502

Queen-sized Futon. Easily convertible guest bed/sofa, cherry-wood frame, thick foam core for comfort and durablity. $200.00. 925-456-5621

Flat VHS storage container with cover; easily slides in and out of cabinets, under bed etc. Holds 20 VHS tapes. $8. Brand new; never used. 925-634-1110

Rival chrome plated electric food slicer 7 1/4 inch blade $30 925-735-6002

Sofa & loveseat, geometric pattern w/brown/green/cream tones. $225.00 OBO. Coffee & end table (oak w/glasstop) All good cond. $75.00 OBO. Pix avail. 510-792-1538

MOVING-Clean,good brand and quality couches, including coffe table, lamp and end table, one year old. $1000.00 OBO. Call evenings 925-449-1718

Stove - 40 in. Avocado Green (A classic!) Fair condition. $25 209-599-7893

Corner entertainment center, 36in TV. Solid oak, mahogany stain, bifold doors. NICE!$1500 new, asking $600. 925-455-6912

King and Queen bedding sets. Comforter, sheets, dust ruffle, shams, pillows included. Nice plaid in blues and tans. $75 for either set, OBO. 925-455-6912

2 computer desks (white/silver) $30 ea., 2 matching chairs $15 ea. Desk/chair combo $40/set. Great for school aged children/teens. Great condition! 925-443-3451

Girls 5-peice Bedroom Furniture Set - twin bed, two dressers, vanity, corner unit $250 925-829-1794

Bathroom scale, Taylor Model 9883, Large LED readout, 330 pound capacity, chrome plated bezel. New. Paid $30. $20 925-648-0671

Sofa & 2 Chairs. Sofa-Ivory background w/ blue & mauve stripes, flower & leaf design, white overall. 6 Pillows. Chairs-mauve. $500. 925-240-6312

Miscellaneous

Rokit Electric Scooter for Sale. Speed Up to 13 mph, Range 6 to 9 Miles and Color is Red. Retail price $249 Asking $150 925-455-6310

Jurassic Park toys. Figurines, dinosaurs, trucks. All good to excellent condition. Large box full. $25.00 for entire box. 925-447-1360

Sit n Stand LX stroller by Baby Trends. Ex condition. One child sits in front, second child sits or stands in back. $80. 925-321-0791

Garage Sale 4185 Rennellwood Way, Pleasanton Jr. & Misses Cloth Sz 3-8. Women Shoes Sz 7-11. sleeping bags, patio furn, chairs Free Gift w/pur. 925-462-4927

Purple HOPE Cancer Braclets for $1.00. Just like the yellow LIVESTRONG braclets from Lance Armstrong. 100% of the proceeds to ACS. 925-373-9435

Rototiller, 6 HP Craftsman, front tined, adjustable tilling width 12-24 inches, good condition $125 925-443-7531

Gently used maternity clothes, large/ex-large. Baby clothes, boy and girl to 2T. Make offer. 925-455-6912

Paintball Marker - Mongoose Reincarnation, Black. Lots of accessories, call for more information, ask for Jacob. $180 OBO 025-443-3451

wood boards, 47 inches length, 12 inches wide, $4.00 each 925-447-0428

Bosch circular saw $75; Craftsman scrolling sabre saw, $25; Makita drill with two 7.2V batt w/chrgr $25; DeWalt radial arm saw $50. Take all $100. 925-443-3760

Black & Decker 5 cordless tools. Includes drill/driver, power hand saw, 3/1 sander, stud sensor, flashlight & 2 18V batteries. Paid $150. New $90 925-648-0671

Motorcycles

2004 - Honda CRF250R Brand New 6 hours. New sticker/number kit. $4250 OBO Call for pictures and information 925-525-1165

Pocket bikes and scooters new 209-525-3557

2005 - 125cc Enduro 10.2 hp $1500.00 elec & kick start, head light, turn signals, front disc brakes, pegs for 2 riders, rear drum brake, street legal 925-216-9553

1999 - LePera motorcycle seat for Harley touring models. It is a gel filled Monterey. Fits 97-01. $225 OBO 925-455-8006

Pets & Supplies

Free to loving home! ~4.5 yr old black female cat. Spayed, de-clawed, no shots due until 3/06. Playful, sweet disposition. 925-449-5650

Purebred Boxer Pups, $300-$325, 3Female 1Male, Very cute 209-815-3882

English Saddle, 17 in. Wintec, great condition, barely used. $200.00 OBO 209-482-3373

Consider saving lives by providing temporary foster care for homeless puppies and kittens. Please call if interested. Thank you 925-980-3035

Recreation Equipment

Intex pool, inflated size 66 inch x 16 inch round, 3 air chambers with double valves. Water capacity is 168 gallons. Never opened, still in box. $10 925-648-0671

Ridesharing

Express your commute, call 2-RIDE for more information or visit http://www-r.llnl.gov/ tsmp.

Oakland/Montclair - has openings. Departs Montclair 7:30 a.m.; departs LLNL 5:00 p.m. For more info call 510-530-1289, ext. 2-9831

Lafayette - LaMOrinda Vanpool (also WALNUT CREEK stop at Rudgear commuter lot): reclining seats, reading lights, 7:45-4:45, $105/mo (pretax reduction available) 925-943-6701, ext. 2-3005

Clayton/Concord/WC/PH - Car pool looking for 2 rider/drivers; leave Rudgear Road P&R @ 6:15; Start wk @ 7:00, Return from Lab @ 4:00;return to P&R @ 4:40. 925-672-6677, ext. 3-2153

San Jose/Fremont - 14 passenger van needs riders; Leaves San Jose/Berryessa 6:40; leaves Fremont/Mission 7:00; arrives LLNL 7:30; leaaves LLNL 4:30. Very reliable. 408-238-1909, ext. 3-3057

Services

College instructor with high school teaching experience available to tutor math and science including AP calc, stats and chemistry. 925-606-4263

Murals, decorative painting, faux finishing, childrens fantasy rooms. 925-461-5045

Martinez Painting Service Residential & Commercial. Interior, Exterior, Acoustic Removal, Pressure Washing, Baseboard Installation. 925-784-1197

ClutterLess(CL) Self Help Group. Clutter stressing you out? Mondays 7-8:30 PM. Come: Pleasanton Presbyterian Church, Rm 7, 4300 Mirador Drive, or 925-443-0766

Shared Housing

Pleasanton - Beautiful room for rent in luxury townhome, private bath and walk in closet no smokers 925-461-5045

Livermore - furnished room near LLNL available now. No pets, stereo, smoking, guns $450.00 per month share utilities and $100 deposit. 925-455-6044

Livermore - furnished room for rent. Clean/quiet/pool. Close to bus/bike path. No pets/no smoking. $550.00/month. Share utilities. Deposit. Mature adult. 925-449-1128

Livermore - :Furnished Master room for rent.Springtown. Clean/quiet.Share utilities.$650/month 925-784-7362

Trucks & Trailers

1994 - JEEP Wrangler. 5 spd, 6 cyl. Only 72K mi. VG condition. Runs great, looks great. Gold Sahara style, lots of chrome & SS. $7900 925-443-6014

2004 - Utility Trailer, 4x6 Ft, Roll-Up Jack, Large 15 Inch Wheels/Tires, Steel Sides and Fenders, Brand New Condition, $650 obo 925-443-3970

Tilting utility 2 wheel trailer, 4x8, 2 spares, very low milage, was stored $485 925-735-6002

1997 - Ford Ranger XLT Ext Cab blue/blue. 4wd, 4.0 V6, 5-sp auto, trlr tow pkg, extras. 113k mi. Good cond. $4500. 925-240-7680

1992 - Salem 21 ft. self contained trailer loaded, easy to tow, exciting layout, like new $4750 obo 209-858-5807

2001 - Toyota Tundra SR5 Extended cab, V8, 4WD, low miles, pwr windows etc., nice camper shell w/roof rack, tow pkg w/brake control; $18,900. 925-373-9608

2001 - Chevy Silverado LS, White, 69K miles, PW, PL, AC, CC, AT, Tinted Windows, Tow Package, Call for more details. $10,500, Priced for quick sale! 209-483-8719

1987 - Ford Ranger V6 2wd set up as prerunner, 31in. tires, fiberglass front fenders, hella lights, does great in the sand. 12x,xxx miles $2200.00 o.b.o. 209-605-2773

1985 - Ford F350 Crew Cab, duely, 6.9 diesel, mechanically good, make offer. 925-455-8944

1985 - Shell, white, from 1985 Nisson PU, $75. If you also take the carpet kit (usable) $65 for both. Interior dimensions 55in x 72in. 925-443-3760

1994 - Ford Bronco XLT, New interior, trans, tires and brakes. Looks and runs great. Only 95k orig. miles. 209-472-7315

Vacation Rentals

Soda Springs/Donner Pass cozy A frame. Close to everything, hike bike fish $200/wknd, $500/wk 209-836-3481

Nice modern cabin above Arnold. 4 bedr, 2 bath. Lakes, hiking, fishing. Website. 925-245-1114

Sooo cute beach cottage in Santa Cruz. 2 bdrm, 2 bath spa. 4blks from nice beach. Summer nearly booked, plan ahead! 925-245-1114

SOUTH LAKE TAHOE - 3 Bedroom 2 Bath Chalet, comfortably furnished, all amenities,close to all skiing,RESERVE NOW! HURRY FOR SKIING/WINTER FUN!! 209-599-4644

Mendocino/Ft. Bragg - Ocean View - large 4bd/4.5ba home in private neighborhood, large yard, hot tub, courtyard, deck, sleeps 10-12, $475/2nts, pets ok w/ deposit 925-455-5942

Pinecrest - (Off Sonora Pass Road), 3 bdrm/2 bath, frplc w/wood, microwave, dishwasher, pool table, large deck and view up No. Fork of Tuolumne, $195/wknd. 925-449-5513

Wanted

Child Booster seat (needed for a 40 lb 4 yr). 415-239-7343

Pontoon Boat, 20-24 feet, running, with trailer, $5000 or less. 925-337-1803

Adult sleeping bags, can you help by donating one or more? Needed for homeless. Thanks for caring! 510-783-2095

WANTED-- Teams for the American Cancer Society 24hr Relay For Life. lets fight cancer together. 10 member teams. June 25-26, 9am-9am. 925-373-9435

Need electrician to install 220 line for spa in new home in Ripon. 209-599-3994

Looking for a wedding videographer for my Sept. 24th wedding. Looking for quality, but simple. LLNL discounts? 925-784-1291

Due to space limitations, *Newsline* may withhold ads that have already run. They will still appear on the Web.

SECURITY CORNER

ISSM Integrated Safeguards & Security Management

A complete guide to selecting a password

By Linda Dibble
INFORMATION TECHNOLOGY PROTECTION DIVISION

The Laboratory requires all employees to follow the password requirements of NNSA policy letter (NAP) 14-2, Chapter 3, found at http://wwwr.llnl.gov/cso/Pubs/NAPS/NAPSdocuments.htm

When selecting a password, the guidelines clearly state it must contain:

• a minimum of eight non-blank characters

• a combination of numbers and alphabetical letters and one special character within first seven positions

• one symbol (uppercase on the numeric keys).

Passwords must not contain a user ID, personal information, simple patterns of number or letters, common words found in the English dictionary, proper names, etc. They must not be shared and passwords used on unclassified information systems must be different than the passwords used on classified information systems.

Using an employee's Official User Name (OUN) and a Personal Access Code (PAC) has become standard for accessing the majority of the institutional business applications (such as LITE, LTRAIN, Data Warehouse, AutoReg and TOPS). The unique OUN is automatically assigned to every employee once they receive a badge at LLNL; employees are responsible for individually creating a PAC. Specific guidelines for establishing a PAC are available at: https://openlabnet.llnl.gov/pac/cgibin/newPAC.cgi.

Employees should be aware that shortcuts to avoid choosing a robust password, such as adding a numeric digit to their mother's maiden name, won't pass the test. The system will not accept a password that does not comply with the stated guidelines. Two conditions must be met when employing the PAC-OUN application: 1) the PAC must be changed every six months and 2) the two most recently used PACs cannot be re-used. The PAC re-use condition will change mid-year when LLNL implements a new system that will store PAC histories. Look for future Cyber Security articles in *Newsline*.

Open LabNet is currently phasing in a requirement for employees to follow the above password guidelines when using an e-mail client such as Eudora. The Cyber Security Program recommends employees also use passwords for off-the-shelf applications (e.g., Extensity and Meeting Maker). These applications manage their own set of passwords separate from the Lab's central PAC authentication registry. Employees should NOT use their institutional PAC password with these applications. The PAC will be exposed to a less secure system, which may not use encrypted network tunnels.

Important points to remember when using passwords:

• Passwords are not to be shared.

• Passwords should be protected from discovery by others.

• If the system provides the capability, employees are strongly encouraged to password the screen savers on their LLNL computers.

• If there is a need to record passwords, the passwords should be kept in a secure area, e.g., a locked desk and encrypted if possible.

• Passwords used on LLNL systems should not be used to access non-LLNL system accounts (e.g., home computer used to access a personal bank account).

Employees are reminded to report any occurrence of password sharing or password policy violation to one of the directorate's information system security officers (ISSOs) or the organizational information system security officer (OISSO).

Laboratory to ensure that ceiling tiles containing asbestos have been identified

The Laboratory has an ongoing asbestos awareness safety program. Facilities have been surveyed and signs posted to identify locations containing asbestos.

Recently, the Laboratory was alerted to concerns with the proper identification of asbestos content in the ceiling tiles in a number of LLNL buildings. This identification is necessary to meet the appropriate labeling and notification requirements before appropriate work control procedures for maintenance or construction work can be undertaken safely. Thirteen buildings (113, 115, 123, 1401, 151, 194, 255, 316, 319, 361, 6525, 836A and 870) are confirmed to have ceiling tiles containing asbestos, and it is possible that some others do as well.

Facility and assurance managers have been briefed on the concern and asked to verify that ceiling tiles meet the criteria for categorization as "asbestos-free" before authorizing any work that requires ceiling tile movement, alteration or removal. A team of industrial hygienists from Hazards Control is assisting facility managers with the assessment in making the determination to assure compliance with our asbestos safety program.

Hazards Control and Plant Engineering will update facility records to include the ceiling tile information that is gathered as a result of new determinations.

Lab staff is reminded that the movement of ceiling tiles is limited to employees who have proper authorization and special training in the safe handling of asbestos. While the risk associated with simple movement of these tiles is extremely low, employees working in any building shall refrain from moving or otherwise disturbing ceiling tiles until they have been properly evaluated.

If employees have any questions, please contact your ES&H Team industrial hygienist for assistance.

NIF's Siegfried Glenzer receives Humboldt Research Award

In recognition of his recent achievements in plasma physics, the National Ignition Facility's Siegfried Glenzer has been awarded the prestigious Humboldt Research Award.

Every year, only 100 scientists from all research fields and from all countries are selected to carry out research projects of their own choice in cooperation with specialist colleagues in Germany to promote international scientific cooperation.

Glenzer was invited by Ronald Redmer to spend an academic year at the University of Rostock and at the Deutsche Elektronen Synchrotron (DESY) facility in Hamburg.

In Rostock, Glenzer will collaborate with Redmer on the planning and interpretation of recent X-ray Compton scattering experiments and will give a lecture on Plasma Diagnostics to advanced students. At DESY, he will participate on the first short-wavelength free electron laser (FEL) experiments that are beginning this year.

"Bringing up the first experiments at the free electron laser will be exciting. I am hoping to repeat my experience on the National Ignition Facility, where we brought up the first laser-plasma interaction experiments," says Glenzer.

The free electron laser at DESY will be followed by two upgraded X-ray facilities, one also to be built at DESY and the second being planned at Stanford University. They will operate by 2010 and will provide unprecedented X-ray beams for novel experiments that include high-energy density science and studies of warm dense matter.

BOB HIRSCHFELD/NEWSLINE

Siegfried Glenzer has been awarded the prestigious Humboldt Research Award.

"I am very honored to receive this award," he said. "In my case it provides the exciting opportunity to collaborate on the upcoming first experiments on the free electron laser at DESY and I will also have the opportunity to teach to excellent students. This award is normally given only to full professors and it shows that working at the Laboratory can be very rewarding."

More information can be found at http://www.avh.de/en/stiftung/leitprinzipien.htm

BLACK HOLES

Continued from page 1

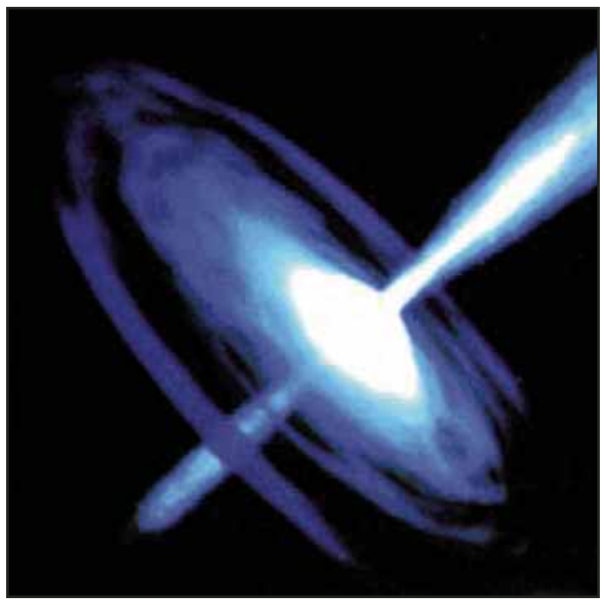
play their usual roles inside compact objects, causing a whole barrage of strange behavior. Behavior that Chapline says occurs in a dark energy star and on Earth when studying quantum critical phenomena.

"There has never been direct evidence of a black hole," said Chapline, while acknowledging there are objects that general relativity would predict are black holes at the centers of galaxies. "Ironically, Einstein also didn't believe in black holes even though he created general relativity.

"Quantum critical phase transitions are not just possible but have actually been seen in the Laboratory," he said.

For example, high temperature superconductivity is an example of quantum critical behavior. Chapline said that plutonium may be another example of an earthly quantum critical system; indeed it is the only example of a pure element that displays quantum critical behavior.

Just how general relativity and quantum mechanics are incompatible has intrigued Chapline for more than 20 years. But it wasn't until the summer of 2000 when Chapline was working on an assignment at Los Alamos that he ran into Nobel laureate and former Lab physicist Bob Laughlin and the two discussed how a quantum phase transition could represent a surface where time stands still.



Chapline sees black holes in a different light.

Chapline and Laughlin pointed out how the behavior of space-time in dark energy stars is very similar to how a superfluid confined to a vertical column might behave. The pressure in the superfluid increases with depth, and if at a certain depth, the speed of sound vanishes then the physical behavior would be indistinguishable from the event horizon of a classical black hole, Chapline said.

"The key is that when the speed of sound goes to zero, it's a signature of quantum criticality," he said. "When sound waves cross this surface, there are very dramatic physics effects."

In a dark energy star, however, Chapline said elementary particles, such as photons, electrons, or quarks, crossing over the quantum critical surface — which replaces the event horizon in a classical black hole — will morph into particles with a large mass and become unstable. Inside the dark energy star, space-time is just like normal space-time, except that the vacuum energy inside is much larger than the cosmological vacuum energy outside the star.

And though his theory has string theorists and general relativists scratching their heads, Chapline sees a future that might just offer an alternate explanation of what happened during the Big Bang.

"This does go against the mainstream predictions of general relativists," he said. "When I came up with this idea, people just thought I was crazy for many, many years. But in 10 years, this will be the orthodox belief. This explanation of dark energy stars will help explain dark matter. This could profoundly change our whole view of the universe."

300 SERIES

Continued from page 1

Computer Support Associate classifications that have been used interchangeably. New job matrices have been written for the combined/replaced classifications.

• Combine Planner/Estimator, Construction and Plant Coordinator classifications to allow flexibility in job assignments and employee career pathing.

• Revise job matrices for the Scientific Associate and Senior Scientific Associate to provide a clearer distinction between these two levels. Develop job matrices for classifications that previously had no matrix available (Film/Television Media Producer and Graphics Design Associate).

In order to get a more complete picture of the Laboratory's market position, the review team also has recommended that several LLNL jobs be added to those already matched in external salary surveys.

The job matrices for all these classifications can be reviewed on the IPPP website at this link: http://www-r.llnl.gov/300_review/

Comments regarding the proposed changes are encouraged and should be provided not later than May 13. Written comments may be sent via Lab mail to 300 Series Study at L-711. E-mail comments may be sent to 300seriesreview@lists.llnl.gov. Anonymous comments can be sent to http://www-r.llnl.gov/300_review/ comments.html.

PURPLE

Continued from page 1

In this first phase, a 256-node cluster called "Purpura" (Latin for Purple) is being installed, according to Hamilton. Each node contains 8 processors. Subsequent deliveries of Purple hardware are scheduled for June (252 nodes), July (252 nodes), and August (776 nodes), for a total of 1,280 nodes. However, the Purpura system will not wait for final integration to become useful, but will be moved into the classified environment and put into service in June.

Once the nodes from each delivery have been tested in the unclassified environment, they will be merged with Purpura in the classified environment late this year to form the final Purple system.

Limited production availability for the full Purple system's 1,536 nodes is expected to be in early 2006. IBM is building the system in its Poughkeepsie, N.Y., production facility. In its final configuration, the system will consist of 269 racks situated in 6,720 square feet of the recently completed TSF, Bldg. 453.

Purple will require 7.5 megawatts of electrical power for the computer and cooling equipment, the equivalent electrical power of 7,500 average homes. Additionally, the full system is expected to generate more than 16 million British thermal units per hour in heat. The TSF's design and cooling system were specially designed to accommodate large ASC systems such as Purple.

Purple is a supercomputing resource shared by Lawrence Livermore, Los Alamos and Sandia national labs under the Advanced Simulation and Computing (ASC) program, a cornerstone of the National Nuclear Security Administration's effort to ensure the safety and reliability of the nation's nuclear deterrent without testing.

The system, which represents the fifth generation ASC platform, was designed and will be used to conduct simulations of nuclear weapons performance.

Sign me up!

Bryan Walker, a senior majoring in science education at CSU Fresno, enrolls on-line for the Edward Teller Science and Technology Symposium, while LLNL's John Hinz of Biosciences looks on.

Walker was part of a group of student teachers who visited the Lab last week, touring the NIF and CAMS facilities and later hearing Hinz' talk on biophotonics at ETEC. The visit is part of an ongoing collaboration of ETEC and the Science and Math Education Center at CSU Fresno, and the first such visit to acquaint prospective science teachers with ETEC and STEP programs prior to their placement in the classroom.

JOHN MADUELL/TID

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